Inductive Argument: Empirical (Bottom up) Reasoning

Empirical Reasoning is used when we want to explain, predict or control what happens. Human beings want to assure our well-being (health, safety, survival etc.) to whatever extent possible by controlling the world around us.

Steps in a Scientific/Empirical Investigation

1. Identify a problem of significance.
2. Form a hypothesis that describes what can be expected to happen under certain conditions. (If\_\_\_\_\_\_\_\_\_\_\_\_\_\_then\_\_\_\_\_\_\_\_\_\_\_.)
3. Review the scientific literature to see what can be learned from the work of others about this hypothesis or similar hypothesis.
4. Identify all the factors related to the hypothesis and the phenomenon of interest that it will be important to measure control or monitor.
5. Make each factor measurable.
6. Assure that the experimental conditions can be met.
7. Design a procedure to assure that the date gathered will reveal the full range of possible observations.
8. Construct reliable measuring devices and test them.
9. Conduct the experiment and gather the data.
10. Conduct appropriate analysis of the data.
11. Interpret the findings and discuss their significance.
12. Extend the research by articulating new hypotheses.
13. Publish the research.

Peter Facione Think Critically NY: Prentice Hall 2011 pp 202-205.

Discussion Questions:

Why is this elaborate process necessary to produce reliable results?

What is the purpose of each step?

What steps in the process are most vulnerable to invalidating the results?